1745 *Larentia clavaria* (Haw.) 13.x.84
1752 *Cosmorhoe ocellata* (Linn.) 22.viii.78
1755 *Eulithis testata* (Linn.) 7.viii.81
1758 *E. pyraliata* (D.&S.) 4.vii.95
1765 *Cidaria fulvata* (Forst.) 24.vi.71
1776 *Colostygia pectinaria* (Knoch) 29.viii.85
1804 *Perizoma bifaciata* (Crewe) 30.viii.77
1807 *P. albulata* (D.&S.) 5.vii.82
1855 *Eupithecia phoeniciata* (Ramb.) 15.ix.77
1874 *Euchoeca nebulata* (Scop.) 12.vi.89
1875 *Asthena albulata* (Hufn.) 17.v.89
1881 *Trichopteryx carpinata* (Borkh.) 10.v.89
1885 *Abraxas sylvata* (Scop.) 20.vii.96
1888 *Ligdia adustata* (D.&S.) 19.viii.94
1896 *Semithisa brunneata* (Thumb.) 25.vi.60
1903 *Plagodis pulveraria* (Linn.) 4.vi.82
1910 *Apeira syringaria* (Linn.) 2.vi.59
1919 *Selenia tetralunaria* (Hufn.) 20.vii.87
1950 *Parectropis similaria* (Hufn.) 29.v.89

ARCTIIDAE
2037 *Millochrista miniata* (Forst.) 13.vii.84
2040 *Cybosia mesomella* (Linn.) 30.vi.68

NOCTUIDAE
2149 *Polia trimaculosa* (Esp.) 26.vi.73
2153 *Heliophobus reticulata* (Goeze) 27.vi.59
2183 *Orthosia miniosa* (D.&S.) 24.iv.94
2197 *Mythimna straminea* (Treit.) 21.viii.77
2203 *M. unipuncta* (Haw.) 1.x.85
2235 *Lithophane semibrunnea* (Haw.) 13.iv.79
2248 *Dryobotodes eremita* (Fabr.) 26.ix.83
2391 *Chilodes maritimus* (Tausch.) 19.viii.76
2400 *Heliothis armigera* (Hb.) 22.x.88
2418 *Earias clorana* (Linn.) 4.vii.59
2475 *Parascotia fuliginosa* (Linn.) 9.viii.91
2476 *Hypena crassalis* (Fabr.) 27.vii.85

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Range expansion in the Ringlet *Aphantopus hyperantus* (L.) (Lep.: Nymphalidae)

In Britain, the northern limit of the Ringlet's distribution is correlated with the 14°C July isotherm. The species is absent from areas over 300m in the north of its range but also from large areas of lowland central Scotland and northern England where it formerly occurred in the past.

When I moved to North East Fife in 1978 I was struck by the apparent contrast in the ranges of Meadow Brown and Ringlet. The former species was common and widespread over the whole of Fife, while the Ringlet, although common and numerous in localities in North East Fife District, appeared to be entirely absent from Kirkcaldy and Dunfermline Districts. This pattern of distribution was confirmed by Thomson (1980, *The Butterflies of Scotland: A Natural History*). I began mapping butterflies by 1km squares in 1979 and encouraged other naturalists working in the area to send me their records. By 1982 local mapping confirmed the Ringlet in OS grid squares NO 10, NO 11, NO 21, NO 22, NO 30, NO 31, NO 32, NO 41, NO 42, NO 51 and NO 52. Ringlet were apparently widespread north of a line extending east by north-east from Tarhill, in Kinross, on the northern shore of

Loch Leven (where a small population was known to John Clayton) to Cults Farm, south of Cupar, across to Buddo Ness, some 4km to the east of St. Andrews.

This distribution, which is shown in Heath, Pollard & Thomas, 1984 (*Atlas of Butterflies in Britain and Ireland*), cannot be explained either by habitat distribution or on topographical grounds. Although Loch Leven, the Lomond Hills, which rise to 400m, and the line of lower hills extending eastwards offer some physical barrier to Ringlet dispersing southwards, there are no such barriers to the south and south-east of St. Andrews.

By 1983 I had got used to the notion of Ringlet being inexplicably restricted to the north of the county and was, therefore, surprised to find a single butterfly on a field edge adjacent to the B.941 road (NO 490044) near Balcarres in July of that year, some 8km beyond the Ringlet's "southern limit". This sighting was also the first record from NO 40 and was followed by another report by Simon Leach from Gilston on 16 August. In the same year Bill Melrose mapped Ringlet in a number of 1km squares to the south of Cults Hill, Jim Glover noted small number on the east shoulder of the East Lomond for the first time, and John Clayton found Ringlet in two new squares by Loch Leven.

In 1984 Jim Glover found that Ringlet had spread to just north of Glenrothes in 13 new contiguous 1km squares; there were reports from nine additional 1km squares in NO 40, and a first report from NO 50. 1985 saw Ringlet on the south coast of the East Neuk for the first time this century: Roger Banks recorded one at Crail (first for NO 60); Anne-Marie and Chris Smout reported Ringlet from Anstruther and Kincraig Head, near Elie (first for NT49). In 1986 John Clayton found Ringlet by Portmoak on the south-east side of Loch Leven and the first records from Dumfermline District came with sightings near Kelty NT 19 and Blairhall NT 08. By the time butterflies records up to 1992 for Fife were published (Smout & Kinnear, 1993 *The Butterflies of Fife: A provisional atlas*. Fife Regional Council) there were new records from the outskirts of Kirkcaldy NT 39, but still less than a dozen sightings of Ringlet for the whole of southern Fife.

In the past six years Ringlet range has continued to expand and this species has now been recorded from every 10km square in Fife except NT 28 and the Forth islands. Similar expansion of range appears to be taking place in the Lothians.

The absence of Ringlet from urban and industrial Britain has been noted since the last century. However, as Heath *et al.* (1984) have pointed out, although Ringlet distribution is similar to that of lichens affected by sulphur dioxide, there is "no evidence of susceptibility to sulphur dioxide or other pollutants". A few years ago I was discussing air pollution and its link with Ringlet distribution in Fife with Ben Jack, who farms in the Lomond Hills. He remarked that farmers were now having to apply sulphur to compensate for the drop in air borne deposits. These compounds will also typically kill off rusts and fungi. Could it be that these rusts and fungi occurring on grasses provide essential nutrients for the development of Ringlet larvae? Steve Wallace of the Scottish Agricultural College has advised me that sulphur compounds are typically applied to cereal crops to control mildew at two to 10 kg/ha, and 10 to 30 kg/ha on brassicas such as oil seed rape in February/March.

Sulphur compounds such as ammonium sulphate are also being increasingly applied as a fertiliser in the early summer on grasslands cut for silage. Ringlet larvae would therefore be exposed to such treated areas throughout their development, which might explain why Ringlet are so rarely seen on improved grasslands. Until recently south Fife has been downwind of heavy industries and coal-burning generating plants which have produced considerable airborne sulphur pollutants. Has the higher ground of the Lomonds and Cult ridge been sufficient to restrict air borne drift into the north of the county and enabled the Ringlet to survive there? At any rate the rapid spread of Ringlet back to the south of Fife over the past 15 years is correlated with a decrease in heavy industrial activity upwind and the need for farmers in the east of Scotland to apply sulphur compounds to crops.

The apparent connection of Ringlet distribution and the possible effects of sulphur products on its larval food plants is a subject which warrants further investigation by laboratory studies.– P.K. KINNEAR, 20 East Queen Street, Newport-on-Tay, Fife DD6 8AY.

Clitostethus arcuatus (Rossi) (Col.: Coccinellidae) from malaise traps in Northamptonshire, Norfolk and Hampshire

A single specimen of this distinctive small ladybird was taken by RCW between 5 and 8 August 1995 in a malaise trap in the wooded part of a rural garden at Hemington, Northamptonshire (OS grid reference TL 091852). Three further specimens have recently been identified among malaise trap samples collected by staff of the Entomology Branch of Forest Research (Forestry Commission) Alice Holt, between 14 and 28 June 1995, as part of their national Biodiversity Research Programme. Two were from a pre-thicket Scots pine plantation at Lynford, Thetford Forest, Norfolk (TL 833901), and the other from mature Scots pine in Denny Lodge Inclosure, New Forest, Hampshire (SU 341038).

Hyman & Parsons (1992. *Review of the scarce and threatened Coleoptera of Great Britain. Part 1.* UK Joint Nature Conservation Committee, Peterborough) list *Clitostethus arcuatus* (Rossi) as an RDB1, Endangered, species "recorded from Surrey, Berkshire, Oxfordshire, East Suffolk and Leicestershire before 1970 and from Oxfordshire and East Suffolk from 1970 onwards". At the time he wrote his New Naturalist monograph (1994. *Ladybirds.* Harper Collins), Michael Majerus was unaware of any additional recent records for this species, but in October 1993 I.S. Menzies (1994, *Br. J. Ent. Nat. Hist.* **7**: 172) had exhibited two specimens collected during 1993 from Bookham Common, Surrey (TQ 1255). One was beaten from holly beneath oak on 29 February, and the other was beaten from ivy on an oak trunk on 14 August. He also reported that Dr R.G. Booth had taken single examples at the same locality on 7 March 1992 and 6 March 1993. According to Majerus (1994, *op.cit.*) *Clitostethus arcuatus* may be associated with ivy on deciduous and coniferous trees where it feeds on the eggs of whitefly. D.B. Shirt (1987, *British Red Data Book 2 Insects.* NCC) reports how N.J. Mills found a breeding colony of *Clitostethus* in Oxford during 1979 and 1980 (but not 1981) on a bush of *Viburnum tinus* infested with whitefly.